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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/771,603	PARK ET AL.
	Examiner	Art Unit
	Li Liu	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13 and 15-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13 and 15-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/2/2007*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments with respect to claims 1 and 18 have been considered but are moot in view of the new ground(s) of rejection.

Claim Objections

2. Claims 15 and 17 are objected to because of the following informalities:

1). Page 8, line 1 of claim 15, the "claim 14" should be changed to – claim 13 --.

2). Page 9, line 1 of claim 17, the "claim 14" should be changed to – claim 13 --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-13 and 15-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

1). Claim 1 recites the limitation "the bidirectional add/drop multiplexer" in line 7 of page 3. There is insufficient antecedent basis for this limitation in the claim.

2). Claim 18 recites the limitation "the bidirectional add/drop multiplexer" in line 3 of page 10. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 2 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al (US 2004/0033076) in view of Oberg et al (US 2005/0084262) and Van Deventer (US 5,886,801).

1). With regard to claim 1, Song et al discloses a wavelength division multiplexing (WDM) hubbed ring network (Figure 6) in which one central office is connected to a plurality of remote nodes by one optical transmission line, said network comprising:

said one central office (CO in Figure 6), said one central office being configured for generating a high-priority optical signal (the normal signal from TX1 and MUX1 in Figure 6, [0071]-[0078]) and a low-priority optical signal (the redundancy signal from TX2 and MUX2 in Figure 6, for self-healing purpose, [0072] - [0078]) at each wavelength corresponding to a channel in a first channel group (the transmitted λ_1, λ_2 … λ_n), WDM-multiplexing (two multiplexers MUX1 and MUX2 in Figure 6) high-priority optical signals and low-priority optical signals of respective channels in the first channel group, transmitting the multiplexed optical signals to each of the remote nodes in different directions ring-wise a round said ring network by means of said one optical transmission line (Single Fiber Bi-directional, the normal signal and redundancy signal are transmitted in opposite directions), and receiving from said remote nodes, at each

wavelength corresponding to a channel in a channel group (the added λ_1, λ_2 … λ_n from remote nodes) and in respectively different directions ring-wise around said ring network, a high-priority optical signal (received by RX1 in Figure 6) and a low-priority optical signal (received by RX2 in Figure 6); and

said remote nodes (e.g., RN1, RNn etc in Figure 6), said remote nodes being configured for receiving (the Add/Drop in Figure 6 is shown in Figure 5) from said central office by means of said one optical transmission line and in respectively different directions ring-wise around said ring network a high-priority optical signal (e.g., the signal λ_m dropped by WDM 201 in Figure 5) and a low-priority optical signal (e.g., the signal λ_m dropped by WDM 202 in Figure 5) at a common wavelength that corresponds to a respective channel in the first channel group (Figure 5, [0071]), generating a high-priority optical signal (e.g., the signal λ_m , shown in dashed line, added by WDM 201 in Figure 5, and Figure 6) and a low-priority optical signal (e.g., the signal λ_m , shown in dashed line, added by WDM 202 in Figure 5, and Figure 6) at a common wavelength corresponding to any channel in a channel group (the added λ_1, λ_2 … λ_n from remote nodes), and transmitting to the central office by means of said one optical transmission line (single fiber transmission line, Figure 5 and 6) and in respectively different directions ring-wise around said ring network the generated high-priority and low-priority optical signals at said common wavelength corresponding to said any channel in the second channel group (Figure 5 and 6, RN1 transmits the high priority signal in counter-clockwise and the low priority signal in clockwise).

But, Song et al teaches that the dropped channels and the added wavelengths are in same group or same wavelengths. Song et al does not expressly disclose: (A)

the second channel group with different wavelengths are added or transmitted to the center office (CO) and the center office receives the second channel group; (B) wherein each of the remote nodes further comprises an optical switch installed between the bidirectional add/drop multiplexer and said optical transmission line, and provided with. four ports for performing a switching operation to connect a first port to a second .port and a third port to a fourth port in case of a normal state and to connect the first port to the third port and the second port to the fourth port in case of system failure so that the optical signal having higher priority can be recovered first.

With regard to item (A), however, to use different wavelengths for upstream and downstream is well known and widely used method. Oberg et al discloses that the center office can transmit low channels or odd channels for downstream and the remote node can add high channel or even channels for upstream (Figure 5, [0066]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the wavelength arrangement as taught by Oberg et al to the system of Song et al so that the upstream and downstream channels have different wavelengths and then the interference between channels with same wavelength can be reduced and the wavelength mixing due to the backward scattering of the same wavelength can be eliminated.

With regard to item (B), the applicant actually uses a "cross/bar" switch. The Figures 5(b) and 5(c) of applicant can be plotted as:

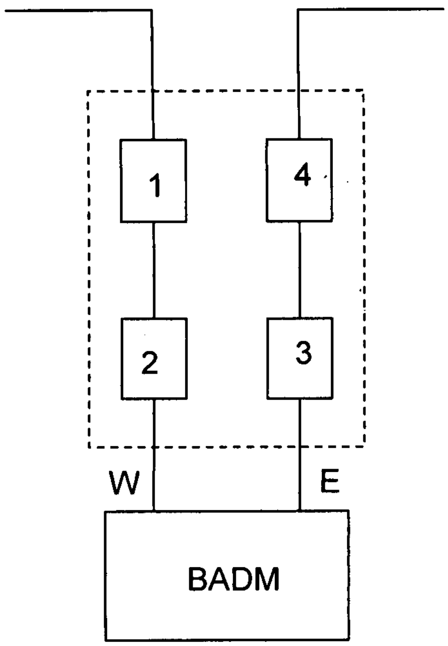

Fig. 5(b)

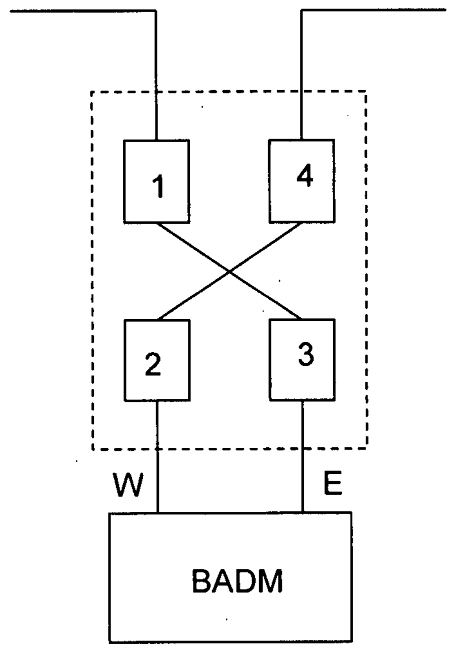

Fig. 5(c)

The cross/bar switch is well known and widely used in the art. Oberg et al teaches a bidirectional add/drop multiplexer and uses a cross-bar switch (Figures 4, 6-12) for performing a switching operation to connect a first port to a second port and a third port to a fourth port in case of a normal state and to connect the first port to the third port and the second port to the fourth port in case of system failure so that the optical signal having higher priority can be recovered first (Oberg et al: ABSTRACT; [0070]-[0073]).

But, in Oberg's system, the cross-bar switch is connected to the one fiber line via the add/drop filter 27w and 27e, the switch is not directly connected to the one fiber line.

However, where the switch is putted is just a design choice, as long as the switch can perform the operation so that the network is self-healing and the optical signal having higher priority can be recovered first.

Another prior art, Van Deventer, teaches a cross/bar switch (Figure 2) for self-healing single network. Van Deventer discloses wherein each of the remote nodes (Kn in Figure 1) further comprises an optical switch (Figure 2) installed between a add/drop multiplexer (e.g. 33 in Figure 2) and said optical transmission line (24, 25 in Figure 2), and provided with four ports (29-32 in Figure 2) for performing a switching operation to connect a first port to a second .port and a third port to a fourth port in case of a normal state (S1 in Figure 2) and to connect the first port to the third port and the second port to the fourth port in case of system failure (S2 in Figure 2) so that the optical signal having higher priority can be recovered first (ABSTRACT, and column 4 line 62 to column 5 line 59).

Oberg et al and Van Deventer teaches the protective switch arrangement for each add/drop node so that the network is self-healing and higher priority signal. And Oberg et al teaches the high priority signal protection and cost saving: a common wavelength is used for both high priority and low priority channels, no extra wavelength is occupied. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the cross-bar switch as taught by Oberg et al and Van Deventer to the system of Song et al so that the bidirectional single fiber network is self-healing and the high priority channels can be protected and a bidirectional low cost single fiber system can be obtained.

2). With regard to claim 2, Song et al and Oberg et al and Van Deventer disclose all of the subject matter as applied to claim 1 above, and Song et al further discloses wherein said central office comprises:

a plurality of light sources (TX1 and TX2 etc in Figure 1) for generating a high-priority optical signal and a low-priority optical signal for each channel in the first channel group;

multiplexers for WDM-multiplexing the high-priority optical signal (MUX1 in Figure 6) and the low-priority optical signal (MUX2 in Figure 6) of each channel in the first channel group;

demultiplexers for demultiplexing a high-priority optical signal (MUX1 in Figure 6) and a low-priority optical signal (MUX2 in Figure 6) of each channel in a channel group, transmitted bidirectionally from the optical transmission line; and

a plurality of receivers (RX1 and RX2 in Figure 6) for receiving the demultiplexed high-priority optical signal and low-priority optical signal for each channel.

But, Song et al teaches that the downstream and upstream wavelengths are in same group or same wavelengths. Song et al does not disclose that the center office (CO) receives the second channel group.

However, to use different wavelengths for upstream and downstream is well known and widely used method. Oberg et al discloses that the center office can transmit low channels or odd channels for downstream and the remote node can add high channel or even channels for upstream (Figure 5, [0066]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the wavelength arrangement as taught by Oberg et al to the system of Song et al so that the upstream and downstream channels have different wavelengths and then the interference between channels with same

wavelength can be reduced and the wavelength mixing due to the backward scattering of the same wavelength can be eliminated.

3). With regard to claim 18, Song et al et discloses a central office of a wavelength division multiplexing (WDM) hubbed ring network in which one central office (CO in Figure 6) is connected to a plurality of remote nodes (e.g., the RN1 ... RNn et al in Figure 6) by one optical transmission line (single optical fiber network, [0070]), said central office being configured for generating a high-priority optical signal (the normal signal from TX1 and MUX1 in Figure 6, [0072]) and a low-priority optical signal (the redundancy signal from TX2 and MUX2 in Figure 1, [0072] and [0078]) at each wavelength corresponding to a channel in a first channel group (the transmitted λ_1, λ_2 ... λ_n), WDM-multiplexing (two multiplexers MUX1 and MUX2 in Figure 6) high-priority optical signals and low-priority optical signals of respective channels in the first channel group, transmitting the multiplexed optical signals to each of the remote nodes (RN1, .. RNn etc, in Figure 6) in different directions ring-wise a round said ring network by means of said one optical transmission line (Single Fiber Bi-directional, Figure 6), and receiving (RX1 and RX 2 in Figure 6) from said remote nodes, at each wavelength corresponding to a channel in a channel group and in respectively different directions ring-wise around said ring network, a high-priority optical signal (received by RX1 in Figure 6) and a low-priority optical signal (received by RX2 in Figure 6).

But, Song et al teaches that the dropped channels and the added wavelengths are in same group or same wavelengths. Song et al does not disclose: (A) the second channel group with different wavelengths are added or transmitted to the center office (CO) and the center office receives the second channel group; (B) wherein each of the

remote nodes further comprises an optical switch installed between the bidirectional add/drop multiplexer and said optical transmission line, and provided with. four ports for performing a switching operation to connect a first port to a second .port and a third port to a fourth port in case of a normal state and to connect the first port to the third port and the second port to the fourth port in case of system failure so that the optical signal having higher priority can be recovered first.

With regard to item (A), however, to use different wavelengths for upstream and downstream is well known and widely used method. Oberg et al discloses that the center office can transmit low channels or odd channels for downstream and the remote node can add high channel or even channels for upstream (Figure 5, [0066]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the wavelength arrangement as taught by Oberg et al to the system of Song et al so that the upstream and downstream channels have different wavelengths and then the interference between channels with same wavelength can be reduced and the wavelength mixing due to the backward scattering of the same wavelength can be eliminated.

With regard to item (B), the applicant actually uses a "cross/bar" switch. The cross/bar switch is well known and widely used in the art. Oberg et al teaches a bidirectional add/drop multiplexer and uses such a cross-bar switch (Figures 4, 6-12) for performing a switching operation to connect a first port to a second port and a third port to a fourth port in case of a normal state and to connect the first port to the third port and the second port to the fourth port in case of system failure so that the optical signal having higher priority can be recovered first (Oberg et al: ABSTRACT; [0070]-[0073]).

But, in Oberg's system, the cross-bar switch is connected to the one fiber line via the add/drop filter 27w and 27e, the switch is not directly connected to the one fiber line.

However, where the switch is putted is just a design choice, as long as the switch can perform the operation so that the network is self-healing and the optical signal having higher priority can be recovered first.

Another prior art, Van Deventer, teaches a cross/bar switch (Figure 2) for self-healing single network. Van Deventer discloses wherein each of the remote nodes (Kn in Figure 1) further comprises an optical switch (Figure 2) installed between a add/drop multiplexer (e.g. 33 in Figure 2) and said optical transmission line (24, 25 in Figure 2), and provided with four ports (29-32 in Figure 2) for performing a switching operation to connect a first port to a second .port and a third port to a fourth port in case of a normal state (S1 in Figure 2) and to connect the first port to the third port and the second port to the fourth port in case of system failure (S2 in Figure 2) so that the optical signal having higher priority can be recovered first (ABSTRACT, and column 4 line 62 to column 5 line 59).

Oberg et al and Van Deventer teaches the protective switch arrangement for each add/drop node so that the network is self-healing and higher priority signal. And Oberg et al teaches the high priority signal protection and cost saving: a common wavelength is used for both high priority and low priority channels, no extra wavelength is occupied. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the cross-bar switch as taught by Oberg et al and Van Deventer to the system of Song et al so that the bidirectional single fiber

network is self-healing and the high priority channels can be protected and a bidirectional low cost single fiber system can be obtained.

4). With regard to claim 19, Song et al and Oberg et al and Van Deventer disclose all of the subject matter as applied to claim 18 above, and Song et al further discloses that said network further comprising said remote nodes, said remote nodes (RN1, ... RNn etc in Figure 6) being configured for receiving (the Add/Drop in Figure 6 is shown in Figure 5) from said central office by means of said one optical transmission line and in respectively different directions ring-wise around said ring network a high-priority optical signal (e.g., the clockwise signals $\lambda 1$ ... λn from TX1 and MUX1 of CO in Figure 6, and λm received by the ADD/DROP WDM 201 in Figure 5, [0064],[0065]) and a low-priority optical signal (e.g., the counter-clockwise signals $\lambda 1$ ... λn from TX2 and MUX2 of CO in Figure 6, and λm received by the ADD/DROP WDM 202 in Figure 5, [0064], [0065]) at a common wavelength that corresponds to a respective channel in the first channel group.

5). With regard to claim 20, Song et al and Oberg et al and Van Deventer discloses all of the subject matter as applied to claim 18 and 19 above, and Song et al further discloses said remote nodes being further configured for generating a high-priority optical signal (e.g., the signal λ_m , shown in dashed line, counter-clockwise, added by WDM 201 in Figure 5, and Figure 6) and a low-priority optical signal (e.g., the signal λ_m, shown in dashed line, clockwise, added by WDM 202 in Figure 5, and Figure 6) at a common wavelength corresponding to any channel in a channel group (the added λ_1, λ_2 ... λ_n from remote nodes), and transmitting to the central office by means of said one optical transmission line (single fiber transmission line, Figure 5 and 6) and

in respectively different directions ring-wise around said ring network the generated high-priority and low-priority optical signals at said common wavelength corresponding to said any channel in the second channel group (Figure 5 and 6, e.g., the RN1 transmits the high priority signal in counter-clockwise and the low priority signal in clockwise).

But, Song et al teaches that the dropped channels and the added wavelengths are in same group or same wavelengths. Song et al does not disclose that a second channel group with different wavelengths are added or transmitted to the center office (CO) and the center office receives the second channel group.

However, to use different wavelengths for upstream and downstream is well known and widely used method. Oberg et al discloses that the center office can transmit low channels or odd channels for downstream and the remote node can add high channel or even channels for upstream (Figure 5, [0066]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the wavelength arrangement as taught by Oberg et al to the system of Song et al so that the upstream and downstream channels have different wavelengths and then the interference between channels with same wavelength can be reduced and the wavelength mixing due to the backward scattering of the same wavelength can be eliminated.

7. Claims 3-5, 12, 13, and 15-17 rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al and Oberg et al and Van Deventer as applied to claims 1-2 above, and in further view of Arecco (US 6,400,476).

1). With regard to claim 3, Song et al and Oberg et al and Van Deventer disclose all of the subject matter as applied to claims 1 and 2 above.

But Song et al does not expressly discloses: (A) first optical switches for setting a path to the multiplexers, according to priorities, for the high-priority optical signal and the low-priority optical signal of each channel in the first channel group from the light sources; and (B) second optical switches for setting a path to the receivers according to priorities, for the high-priority optical signal and the low-priority optical signal of each channel in the second channel group, transmitted bidirectionally from the optical transmission line.

However, Oberg et al teaches a first optical switches (e.g., 63t in Figure 10) for setting a path to the multiplexers, according to priorities, for the high-priority optical signal and the low-priority optical signal of each channel in the first channel group from the light sources; and second optical switches (e.g., 63r in Figure 10) for setting a path to the receivers according to priorities, for the high-priority optical signal and the low-priority optical signal of each channel in the second channel group, transmitted bidirectionally from the optical transmission line. Also, Arecco discloses the first optical switches (131 in Figure 1, column 5 line 9-43, and column 7 line 24-30) for setting a path to the multiplexers, according to priorities, for the high-priority optical signal and the low-priority optical signal of each channel in the first channel group from the light sources; and second optical switches (132 in Figure 1, column 5 line 9-43, and column 7 line 24-30) for setting a path to the receivers according to priorities, for the high-priority optical signal and the low-priority optical signal of each channel in the second channel group, transmitted bidirectionally from the optical transmission line.

By monitoring and switching, traffic can be controlled or routed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the switches taught by Oberg et al and Arecco to the system of Song et al so that a low cost single fiber system with high priority channels being protected can be obtained.

2). With regard to claim 4, Song et al and Oberg et al and Van Deventer and Arecco et disclose all of the subject matter as applied to claims 1-3 above. But Song et al does not disclose wherein said central office monitors presence/absence of a system failure by measuring for each channel the output created by the demultiplexer in the demultiplexing of said high-priority optical signal.

However, Arecco discloses the monitoring presence/absence of a system failure (column 5 line 27-30, Figure 2).

By monitoring and switching, traffic can be controlled or routed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the monitoring taught by Arecco to the system of Song et al and Oberg et al so that a low cost single fiber system with high priority channels being protected can be obtained.

3). With regard to claim 5, Song et al and Oberg et al and Van Deventer and Arecco discloses all of the subject matter as applied to claims 1-4 above. But Song et al does not expressly discloses optical couplers, photo diodes and optical switch control circuits.

However, Arecco further discloses wherein said central office comprises:

optical couplers (222 in Figure 2) each connected to an output terminal of each channel's optical signal from the demultiplexer for demultiplexing the high-priority optical signal in the second channel group, the optical coupler extracting a high-priority optical signal;

photo diodes (219 in Figure 2) connected to the associated optical couplers, for detecting optical power of each channel's optical signal; and

optical switch control circuits (220 and 221 in Figure 2) connected to the associated photo diodes, for simultaneously controlling the optical switches according to optical powers detected by the photo diodes.

By monitoring the signal loss, traffic can be controlled or routed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the monitoring taught by Arecco to the system of of Song et al and Oberg et al so that a low cost single fiber system with high priority channels being protected can be obtained.

4). With regard to claim 12, Song et al and Oberg et al and Van Deventer and Arecco discloses all of the subject matter as applied to claims 1 and 2 above. But Song et al does not expressly discloses wherein the central office further comprises a circulator connected to the optical transmission line, for outputting the multiplexed optical signals in the first channel group from the multiplexers to the optical transmission line, and outputting the optical signals in the second channel group, received from the optical transmission line, to the demultiplexers.

However, Oberg et al discloses a circulator (39 in Figure 6) connected to the optical transmission line, for outputting the multiplexed optical signals in the first channel

group from the multiplexers to the optical transmission line, and outputting the optical signals in the second channel group, received from the optical transmission line, to the demultiplexers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply circulator taught by Oberg et al to the system of Song et al and Oberg et al so that the a low cost single fiber bi-directional system with high priority channels being protected can be obtained.

5). With regard to claim 13, Song et al and Oberg et al and Van Deventer and Arecco disclose all of the subject matter as applied to claim 1 above, and Song et al further discloses wherein each of the remote nodes comprises:

light sources (e.g., the light sources that generates the signal λm in Figure 5) for generating, for a given channel in a channel group, an optical signal having higher priority (e.g., the signal λ_m , shown in dashed line, counter-clockwise, added by WDM 201 in Figure 5, and Figure 6) and an optical signal having lower priority (e.g., the signal λ_m, shown in dashed line, clockwise, added by WDM 202 in Figure 5, and Figure 6);

a bidirectional add/drop multiplexer (the ADD/DROP, Figure 5) for dropping a high-priority optical signal (dropped by the WDM 201 in Figure 5) and a low-priority optical signal (dropped by the WDM 202 in Figure 5) of a given channel in the first channel group, transmitted from the optical transmission line, and adding to said optical transmission line the optical signals generated for said given channel (e.g., the signal λ_m, shown in dashed lines, added by WDM 201 and WDM 202 in Figure 5, and Figure 6) in the a channel group; and

receivers (receivers to receiver the dropped signals, Figures 5 and 6, [0083]) for receiving the dropped optical signals.

But, Song et al teaches that the dropped channels and the added wavelengths are in same group or same wavelengths. Song et al does not disclose that a second channel group with different wavelengths are added or transmitted to the center office (CO) and the center office receives the second channel group.

However, to use different wavelengths for upstream and downstream is well known and widely used method. Oberg et al discloses that the center office can transmit low channels or odd channels for downstream and the remote node can add high channel or even channels for upstream (Figure 5, [0066]).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the wavelength arrangement as taught by Oberg et al to the system of Song et al so that the upstream and downstream channels have different wavelengths and then the interference between channels with same wavelength can be reduced and the wavelength mixing due to the backward scattering of the same wavelength can be eliminated.

6). With regard to claim 15, Song et al and Oberg et al and Van Deventer and Arecco discloses all of the subject matter as applied to claims 1 and 13 above. But Song et al does not expressly disclose wherein each of the remote nodes monitors presence/absence of a system failure by measuring a high-priority optical signal of a channel in the first channel group, said optical signal of a channel in the first channel group having been transmitted from the optical transmission line for said measuring.

However, Oberg et al discloses that the remote node monitors presence/absence of a system failure by measuring a high-priority optical signal of a channel in the first channel group, said optical signal of a channel in the first channel group having been transmitted from the optical transmission line for said measuring (power monitor 37 in Figure 4 and 6). Van Deventer also teaches wherein each of the remote nodes monitors presence/absence of a system failure by measuring a high-priority optical signal of a channel in the first channel group (column 5, line 44-59; 37 and 42 in Figure 2).

Oberg et al teaches the high priority signal protection and cost saving: a common wavelength is used for both high priority and low priority channels, no extra wavelength is occupied.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the monitoring taught by Oberg et al and Van Deventer to the system of Song et al so that the high priority channels can be protected and the a bidirectional low cost single fiber system can be obtained.

7). With regard to claim 16, Song et al and Oberg et al and Van Deventer and Arecco disclose all of the subject matter as applied to claims 1, 13 and 15 above. And Oberg et al further discloses wherein each of the remote nodes comprises:

optical couplers ([0064]) each connected to the optical transmission line where a high-priority optical signal is received in a normal state, for extracting a high-priority optical signal;

a photo diode (37 in Figures 4, 6 and 8) for detecting an optical power of a high-priority optical signal extracted by an optical coupler of said optical couplers; and

an optical switch control circuit ([0064] and [0072]) connected to the photo diode, for controlling the optical switch of the respective remote node according the detected optical power.

9). With regard to claim 17, Song et al and Oberg et al and Van Deventer and Arecco disclose all of the subject matter as applied to claims 1and 13 above. And Oberg et al and Van Deventer further discloses wherein the optical switch in each remote node comprises a 2x2 optical switch (Oberg: 33 in Figures 4, 6 and 11; or Van Deventer: 28 in Figure 2) having two pairs of ports, each pair being, in said ring network, ring-wise on opposite sides of the bidirectional add/drop multiplexer, wherein the ports of one of the two pairs are connected in parallel to the ports of the other of the two pairs in a normal state, whereas the connections to the other of the two pairs of ports are reconfigured to swap respective sources from among said one of the two pairs in response to a system failure (Oberg: [0064], [0072], [0073] and [0090]-[0093]; and Van Deventer: column 4 line 62 to column 5 line 59).

For claims 16 and 17, Oberg et al and Van Deventer teaches the monitoring and switching. By monitoring the signal loss, traffic can be controlled or routed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the monitoring and switches taught by Oberg et al and Van Deventer to the system of Song et al so that a low cost single fiber system with high priority channels being protected can be obtained.

8. Claims 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Song et al and Oberg et al and Van Deventer and Arecco as applied to claims 1-3 above, and in further view of Fang et al (US 6,504,963)

1). With regard to claim 6, Song et al and Oberg et al and Van Deventer and Arecco disclose all of the subject matter as applied to claims 1-3 above. But Song et al does not disclose wherein the first optical switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred.

Oberg et al and Arecco discloses an optical switch (Oberg et al: 63 in Figure 10; or Arecco:131 in Figure 1, column 5 line 9-43, and column 7 line 24-30) for setting a path according to priorities, and the switch is actuatable to heal the network. But since Oberg et al and Arecco only give one example of a single wavelength transmitted in the ring, not show that the optical switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred.

However, Fang et al discloses a switch system in which switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred (Figures 5-8, column 5 line 33 to column 6 line 26).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the switches taught by Fang and Oberg et al Arecco to the system of Song et al and Van Deventer so that a low cost single fiber system with high priority channels being protected can be obtained.

2). With regard to claim 7, Song et al and Oberg et al and Van Deventer and Arecco and Fang et al discloses all of the subject matter as applied to claims 1-3 and 6 above. But Song et al does not disclose wherein the healing preferentially provides for

the first channel group a transmission path along the optical transmission line to a high-priority signal over its respective low-priority signal at said common wavelength.

However, Arecco discloses wherein the healing preferentially provides for the first channel group a transmission path along the optical transmission line to a high-priority signal over its respective low-priority signal at said common wavelength (column 5 line 20-43, when breakdown occurs, the high priority channel utilizes in both directions of propagation the complementary network path previously used by the low priority channel. Low priority traffic is lost until the situation returns to normal).

Arecco teaches the high priority signal protection and cost saving. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the healing scheme taught by Arecco to the system of Song et al and Van Deventer so that the high priority channels can be protected and the a bidirectional low cost single fiber system can be obtained.

3). With regard to claim 8, Song et al and Oberg et al and Van Deventer and Arecco and Fang et al disclose all of the subject matter as applied to claims 1-3, 6 and 7 above. But Song et al does not disclose wherein the second optical switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred.

Oberg et al and Arecco discloses an optical switch (Oberg et al: 63 in Figure 10; or Arecco:131 in Figure 1, column 5 line 9-43, and column 7 line 24-30) for setting a path according to priorities, and the switch is actuatable to heal the network. But since Oberg et al and Arecco only give one example of a single wavelength transmitted in the ring, not show that the optical switches are individually selectively actuatable to heal the

network in response to topologically where on the ring network a break in the optical transmission line has occurred.

However, Fang et al discloses a switch system in which switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred (Figures 5-8, column 5 line 33 to column 6 line 26).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the switches taught by Fang and Oberg et al and Arecco to the system of Song et al and Van Deventer so that a low cost single fiber system with high priority channels being protected can be obtained.

4). With regard to claim 9, Song et al and Oberg et al and Van Deventer and Arecco and Fang et al discloses all of the subject matter as applied to claims 1-3 and 6-8 above. But Song et al does not disclose wherein the healing preferentially provides for the second channel group a transmission path along the optical transmission line to a high-priority signal over its respective low-priority signal at said common wavelength.

However, Arecco further discloses wherein the healing preferentially provides for the second channel group a transmission path along the optical transmission line to a high-priority signal over its respective low-priority signal at said common wavelength (column 5 line 20-43, when breakdown occurs, the high priority channel utilizes in both directions of propagation the complementary network path previously used by the low priority channel. Low priority traffic is lost until the situation returns to normal).

Arecco teaches the high priority signal protection and cost saving. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was

made to apply the healing scheme taught by Arecco to the system of Song et al and Van Deventer so that the high priority channels can be protected and the a bidirectional low cost single fiber system can be obtained.

5). With regard to claim 10, Song et al and Arecco et al and Van Deventer and Oberg et al disclose all of the subject matter as applied to claims 1-3 above. But Song et al does not disclose wherein the second optical switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred.

Oberg et al and Arecco discloses an optical switch (Oberg et al: 63 in Figure 10; or Arecco:131 in Figure 1, column 5 line 9-43, and column 7 line 24-30) for setting a path according to priorities, and the switch is actuatable to heal the network. But since Oberg et al and Arecco only give one example of a single wavelength transmitted in the ring, not show that the optical switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred.

However, Fang et al discloses a switch system in which switches are individually selectively actuatable to heal the network in response to topologically where on the ring network a break in the optical transmission line has occurred (Figures 5-8, column 5 line 33 to column 6 line 26).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the switches taught by Fang and Oberg et al and Arecco to the system of Song et al and Van Deventer so that a low cost single fiber system with high priority channels being protected can be obtained.

6). With regard to claim 11, Song et al and Oberg et al and Van Deventer and Arecco and Fang et al discloses all of the subject matter as applied to claims 1-3 and 10 above. But Song et al does not disclose wherein the healing preferentially provides for the second channel group a transmission path along the optical transmission line to a high-priority signal over its respective low-priority signal at said common wavelength

However, Arecco further discloses wherein the healing preferentially provides for the second channel group a transmission path along the optical transmission line to a high-priority signal over its respective low-priority signal at said common wavelength (column 5 line 20-43, when breakdown occurs, the high priority channel utilizes in both directions of propagation the complementary network path previously used by the low priority channel. Low priority traffic is lost until the situation returns to normal).

Arecco teaches the high priority signal protection and cost saving. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the healing scheme taught by Arecco et al to the system of Song et al so that the high priority channels can be protected and the a bidirectional low cost single fiber system can be obtained.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shen et al (Shen et al: "A Novel Single-Fiber Bidirectional Optical Add/Drop Multiplexer for Distribution Networks", Optical Fiber Communication Conference and

Exhibit, 2001. OFC 2001, Vol. 3, page(s): WY5-1- WY5-3) discloses a single fiber bi-directional networks.

Duerksen et al (US 6,321,004) discloses a protectin switching in bidirectional WDM optical networks.

Sakano et al (US 2001/0026384) discloses a single fiber low-cost optical network with switches in center node.

Sato (US 6,477,288) discloses a optical line switching system for ring networks.

Zhao et al (Zhao et al: "A Novel Bi-Directional Add/Drop Module for Single Fiber Bi-Directional Self-Healing Wavelength Division Multiplexed Ring Networks", Optical Fiber Communication Conference, 1999, OFC/IOOC '99, Vol. 1, page 183-185) discloses a single-fiber bi-directional networks.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Li Liu whose telephone number is (571)270-1084. The examiner can normally be reached on Mon-Fri, 8:00 am - 5:30 pm, alternating Fri off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Li Liu
July 27, 2007

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER